

Irwin Industrial Tools GmbH  
 I30315PCT

Claims

1. A clamping and/or spreading tool, comprising a push or pull rod (7) to which a movable jaw (13) is fixed, a stationary jaw (5), a gear mechanism by which the movable jaw (13) is movable towards or away from the stationary jaw (5) by displacement of the push or pull rod (7) in a clamping or spreading direction (S) and by which clamping and/or spreading forces are applicable between the jaws (5, 13), further comprising a lock which blocks displacement of the push or pull rod (7) in opening direction (O) opposite to the clamping or spreading direction (S) so as to maintain the clamping and/or spreading forces generated between the jaws (5, 13), characterized in that a mechanism for dissipating the clamping and/or spreading forces stored allows absorption displacement of the push or pull rod (7) in opening direction (O) along a predetermined absorption path and, especially releasably, blocks absorption displacement of the push or pull rod (7) in opening direction (O) beyond the predetermined absorption path.
2. The clamping and/or spreading tool as claimed in claim 1, characterized in that the mechanism is adapted to be activated, especially by an operator such that, upon activation, the absorption displacement of the push or pull rod (7) in opening direction (O) along the absorption path is allowed independently and, after the absorption displacement, an absorption displacement limitation takes hold automatically.
3. The clamping and/or spreading tool as claimed in claim 1 or 2, characterized in that the mechanism can be activated only upon release of the blocking effect of the lock.
4. The clamping and/or spreading tool as claimed in any one of claims 1 to 3, characterized in that the mechanism can be activated when clamping and/or spreading forces are held at the lock.
5. The clamping and/or spreading tool as claimed in any one of claims 1 to 4, characterized in that the mechanism is or remains deactivated when the clamping and/or spreading tool (1) is not tensioned.

6. The clamping and/or spreading tool as claimed in any one of claims 1 to 5, characterized in that the lock is shiftable essentially in opening direction (O) with respect to the stationary jaw (5), while maintaining its blocking effect, so as to provide the absorption displacement.
7. The clamping and/or spreading tool as claimed in any one of claims 1 to 6, characterized in that the lock is arranged in a support in such a way as to be shiftable in opening direction (O) while its blocking effect is upheld, the support carrying the stationary jaw (5) and holding the push or pull rod for displacement.
8. The clamping and/or spreading tool as claimed in claim 6 or 7, characterized in that the lock is shiftable from a resting position in which it is, especially forcibly, adjusted upon activation of the mechanism, into an absorption end position.
9. The clamping and/or spreading tool as claimed in any one of claims 6 to 8, characterized in that shiftability of the lock is limited, especially by an abutment (69) formed on the support.
10. The clamping and/or spreading tool as claimed in any one of claims 6 to 9, characterized in that the shift distance travelled by the lock during absorption displacement substantially equals the predetermined absorption path.
11. The clamping and/or spreading tool as claimed in any one of claims 1 to 10, characterized in that the mechanism comprises a drive for shifting the lock, with the push or pull rod (7) locked to the same, essentially in opening direction.
12. The clamping and/or spreading tool as claimed in claim 11, characterized in that a drive to be implemented by an operator is provided and preferably comprises an eccentric bearing for the lock, or that at least part of the clamping and/or spreading forces can be introduced into the lock to be shifted, for implementation of the drive.
13. The clamping and/or spreading tool as claimed in any one of claims 1 to 12, characterized in that the lock is formed by a plate-type lock which is forcibly canted with

respect to the push or pull rod (7) to block displacement of the push or pull rod (7) in opening direction (O).

14. The clamping and/or spreading tool as claimed in claim 13, characterized in that the mechanism comprises two plate-type locks, one of which is shiftable with respect to the stationary jaw (5) essentially in opening direction (O) for providing the absorption displacement while the forced canting with respect to the push or pull rod (7) is upheld, whereas the other one is arranged stationarily with respect to the stationary jaw (5), maintaining the forced canting with respect to the push or pull rod (7).

15. The clamping and/or spreading tool as claimed in claim 14, characterized in that the forced canting of the stationary plate-type lock can be lifted before the forced canting of the shiftable plate-type lock.

16. The clamping and/or spreading tool as claimed in claim 14 or 15, characterized in that the clamping and/or spreading forces released upon lifting of the forced canting of the stationary plate-type lock can be introduced into the shiftable plate-type lock such that the shiftable plate-type lock, together with the push or pull rod (7) canted with respect to the same, are shifted from a starting position into an end position at which further shifting is prevented.

17. The clamping and/or spreading tool as claimed in any one of claims 14 to 16, characterized in that the shiftable plate-type lock comprises a wedging plate which is forcibly canted to the push or pull rod (7) so that displacement of the push or pull rod (7) in opening direction (O) with respect to the wedging plate is blocked, said wedging plate contacting a movable place for engagement.

18. The clamping and/or spreading tool as claimed in claim 17, characterized in that the wedging plate constitutes an entraining slide element (27) of the gear mechanism designed as a stepping gear, and the movable place for engagement is presented by the location of power transmission from the entraining slide element (27) into a movable, especially swingable actuating arm (19) of the stepping gear.

19. The clamping and/or spreading tool as claimed in claim 18, characterized in that the actuating arm (19) has a mid position at which the actuating arm (19) is positioned when unloaded, a stroke end position into which the actuating arm (19) can be moved when actuated by an operator to displace the push or pull rod (7) in clamping or spreading direction (S), and an absorption end position, opposed to the stroke end position, into which the actuating arm (19) can be moved for shifting the entraining slide element (27), while maintaining the forced canting thereof, and at which the actuating arm (19) strikes against an abutment (69) present on the support for providing limitation of the absorption displacement.

20. The clamping and/or spreading tool as claimed in any one of claims 1 to 19, characterized in that the mechanism comprises a damper which dampens the absorption displacement of the push or pull rod (7) along the absorption path.

21. The clamping and/or spreading tool as claimed in claim 20, characterized in that the damper is activated only when the mechanism for absorption displacement of the push or pull rod (7) in opening direction (O) is activated.

22. The clamping and/or spreading tool as claimed in claim 20 or 21, characterized in that the damper is formed by a centering spring (61), especially a compression spring adapted to be tensioned by shifting of the lock essentially in opening direction (O).

23. The clamping and/or spreading tool as claimed in claim 22, characterized in that the centering spring (61) is disposed between a support which holds the stationary jaw (5) and the actuating arm (19).

24. The clamping and/or spreading tool as claimed in claim 22 or 23, characterized in that the centering spring (61) and a gear spring for canting the entraining slide element (27) are harmonized such that the actuating arm (19) is forcibly positioned in a mid position out of which lifting motion for the gear mechanism contrary to the gear spring and absorption motion for the mechanism contrary to the centering spring (61) are allowed.

25. The clamping and/or spreading tool as claimed in any one of claims 22 to 24, characterized in that the centering spring (61) tensioned in the absorption end position of the actuating arm (19) can be relieved of tension by lifting the forced canting of the entraining slide element (27), the relaxing centering spring (61), at the same time, especially urging the actuating arm (19) into the mid position.